

IN THE CLAIMS:

On page 11, line 1 please cancel "CLAIMS" and substitute:

--I CLAIM AS MY INVENTION:-- therefor.

Claims 1-26 have been cancelled.

5 1-26. (Cancelled).

Add the following new claims:

27. (New) An implantable medical apparatus for detecting diastolic heart failure (DHF), comprising:

10 a pressure measuring unit adapted to interact with a living subject to measure an absolute pressure value at a location and time selected from the group consisting of the left atrium during the diastasis phase immediately preceding an atrial contraction, and the pulmonary vein when the pulmonary valve is closed, both for a predetermined workload situation of the subject and a rest situation of the subject for a predetermined workload situation of the subject and for a rest situation of the subject; and

15 a calculation unit supplied with said absolute pressure value for said predetermined workload situation and said pressure value for said rest situation, said calculation unit forming a difference, ΔP ,
20 between said absolute pressure value for said predetermined workload situation and said absolute pressure value for said rest situation, and comparing said difference ΔP to a predetermined pressure difference reference value to obtain a comparison result indicative of a DHF state of the heart of the subject.

25 28. (New) An apparatus as claimed in claim 27, comprising an activity sensor adapted to interact with the subject to detect physical activity of the subject, said activity sensor emitting an activity signal, and a workload calculator supplied with said activity signal that calculates a workload situation

of the subject from said activity signal, said workload calculator emitting an output to said calculation unit indicative of said workload situation.

29. (New) An apparatus as claimed in claim 1 wherein said pressure measuring unit measures said absolute value of said pressure at the left atrium during the diastasis phase immediately preceding an atrial contraction, and wherein said apparatus comprises a pressure compensator, supplied with said absolute value of said pressure for said predetermined workload situation and said absolute value of said pressure for said rest situation, that corrects each of said absolute pressure values with a correction value selected from the group consisting of average pressure in the right atrium, and average pressure in the vena cava close to the right atrium.

30. (New) An apparatus as claimed in claim 27 comprising:
an impedance measuring unit having a first electrode adapted for implantation in the left ventricle of the heart and a second electrode adapted for implantation at a location in a subject at which a substantial portion of variations in impedance occur due to a changing volume of the left ventricle;
said impedance measuring unit determining a difference ΔV , from respective signals from said first and second electrodes representing an impedance value measured for said predetermined workload situation and an impedance value measured for said rest situation;
a quotient forming unit that forms a quotient $\Delta P/\Delta V$ and that supplies a signal representing said quotient to said calculation unit; and
said calculation unit comparing said quotient with a predetermined quotient reference value, as said predetermined pressure difference reference value, to obtain said comparison result.

31. (New) An apparatus as claimed in claim 30 wherein said pressure measuring unit measures said absolute pressure value for each of said predetermined workload situation and said rest situation over a plurality of cardiac cycles, and wherein said apparatus comprises an averaging unit that forms a first average value of said absolute pressure values for said

plurality of cardiac cycles for said predetermined workload situation and a second average value of said absolute pressure values for said plurality of cardiac cycles for said rest situation, and wherein said calculation unit forms said difference ΔP from said first and second average values.

5 32. (New) An apparatus as claimed in claim 30 wherein said impedance measuring unit measures said impedance value for each of said predetermined workload situation and said rest situation over a plurality of cardiac cycles, and wherein said apparatus comprises an averaging unit that forms a first average value of said impedance values for said plurality of
10 cardiac cycles for said predetermined workload situation and a second average value of said impedance values for said plurality of cardiac cycles for said rest situation, and wherein said calculation unit forms said difference ΔV from said first and second average values.

 33. (New) An apparatus as claimed in claim 27 wherein said
15 pressure measuring unit measures said absolute pressure value for each of said predetermined workload situation and said rest situation over a plurality of cardiac cycles, and wherein said apparatus comprises an averaging unit that forms a first average value of said absolute pressure values for said plurality of cardiac cycles for said predetermined workload situation and a
20 second average value of said absolute pressure values for said plurality of cardiac cycles for said rest situation, and wherein said calculation unit forms said difference ΔP from said first and second average values.

 34. (New) An apparatus as claimed in claim 27 comprising a wireless communication unit connected to said calculation unit that
25 automatically wirelessly transmits said comparison result to an external receiver.

 35. (New) An apparatus as claimed in claim 27 comprising a memory connected to said calculation unit that stores said comparison result.

 36. (New) An implantable cardiac pacemaker comprising:
30 a diastolic heart failure (DHF) determining device comprising a pressure measuring unit adapted to interact with a living subject to measure an absolute pressure value at a location and time

5 selected from the group consisting of the left atrium during the
diastasis phase immediately preceding an atrial contraction, and
the pulmonary vein when the pulmonary valve is closed, both for
a predetermined workload situation of the subject and a rest
situation of the subject for a predetermined workload situation of
the subject and for a rest situation of the subject, and a
calculation unit supplied with said absolute pressure value for
said predetermined workload situation and said pressure value
for said rest situation, said calculation unit forming a difference,
10 ΔP , between said absolute pressure value for said
predetermined workload situation and said absolute pressure
value for said rest situation, and comparing said difference ΔP to
a predetermined pressure difference reference value to obtain a
comparison result indicative of a DHF state of the heart of the
15 subject; and

a therapy administration unit adapted to interact with the heart of the
subject to administer electrical cardiac therapy thereto, said
therapy administration unit being connected to said DHF
determining device, and being supplied with said comparison
20 result, and administering said electrical cardiac therapy
dependent on said comparison result.

37. (New) An apparatus as claimed in claim 36, comprising an
activity sensor adapted to interact with the subject to detect physical activity of
the subject, said activity sensor emitting an activity signal, and a workload
25 calculator supplied with said activity signal that calculates a workload situation
of the subject from said activity signal, said workload calculator emitting an
output to said calculation unit indicative of said workload situation.

38. (New) A pacemaker as claimed in claim 37 wherein said activity
sensor is a pressure sensor.

30 39. (New) An apparatus as claimed in claim 38 wherein said
pressure measuring unit measures said absolute value of said pressure at the
left atrium during the diastasis phase immediately preceding an atrial

contraction, and wherein said apparatus comprises a pressure compensator, supplied with said absolute value of said pressure for said predetermined workload situation and said absolute value of said pressure for said rest situation, that corrects each of said absolute pressure values with a correction value selected from the group consisting of average pressure in the right atrium, and average pressure in the vena cava close to the right atrium.

40. (New) A method for detecting diastolic heart failure (DHF), comprising the steps of:

measuring an absolute pressure value in vivo in a subject at a location and time selected from the group consisting of the left atrium during the diastasis phase immediately preceding an atrial contraction, and the pulmonary vein when the pulmonary valve is closed, both for a predetermined workload situation of the subject and a rest situation of the subject for a predetermined workload situation of the subject and for a rest situation of the subject; and

electronically forming a difference, ΔP , between said absolute pressure value for said predetermined workload situation and said absolute pressure value for said rest situation, and electronically comparing said difference ΔP to a predetermined pressure difference reference value to obtain a comparison result indicative of a DHF state of the heart of the subject.

41. (New) A method as claimed in claim 40 comprising:

measuring impedance values with a first electrode implanted in the left ventricle of the heart and a second electrode implanted at a location in a subject at which a substantial portion of variations in impedance occur due to a changing volume of the left ventricle;

electronically determining a difference ΔV , from respective signals from said first and second electrodes representing an impedance measured for said predetermined workload situation and an impedance measured for said rest situation;

electronically forming a quotient $\Delta P/\Delta V$; and

wherein the step of electronically comparing comprises comparing said quotient with a predetermined quotient reference value, as said predetermined pressure difference reference value, to obtain said comparison result.

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42. (New) A method as claimed in claim 41 comprising, in a calibration procedure, measuring instantaneous values of said left ventricular volume with an ultrasound technique and establishing a relation between the ultrasonically measured ventricular values and said impedance values
10 measured simultaneously therewith.

43. (New) A method as claimed in claim 41 comprising measuring said absolute pressure value for each of said predetermined workload situation and said rest situation over a plurality of cardiac cycles, and electronically forming a first average value of said absolute pressure values
15 for said plurality of cardiac cycles for said predetermined workload situation and a second average value of said absolute pressure values for said plurality of cardiac cycles for said rest situation, and electronically forming said difference ΔP from said first and second average values.

44. (New) A method as claimed in claim 41 comprising measuring
20 said impedance value for each of said predetermined workload situation and said rest situation over a plurality of cardiac cycles, and electronically forming a first average value of said impedance values for said plurality of cardiac cycles for said predetermined workload situation and a second average value of said impedance values for said plurality of cardiac cycles for said rest
25 situation, and electronically forming said difference ΔV from said first and second average values.

45. (New) A method as claimed in claim 41 comprising measuring said impedance values for said predetermined workload situation of the subject when said subject is not suffering from DHF and determining said
30 reference value therefrom, and measuring said impedance values for said rest situation when said patient is not suffering from DHF and said determining said reference value therefrom.

46. (New) A method as claimed in claim 40 comprising measuring said absolute pressure value for each of said predetermined workload situation and said rest situation over a plurality of cardiac cycles, and electronically forming a first average value of said absolute pressure values
5 for said plurality of cardiac cycles for said predetermined workload situation and a second average value of said absolute pressure values for said plurality of cardiac cycles for said rest situation, and electronically forming said difference ΔP from said first and second average values.

47. (New) A method as claimed in claim 40 comprising
10 automatically wirelessly transmitting said comparison result to an external receiver.

48. (New) A method as claimed in claim 40 comprising electronically storing said comparison result.

49. (New) A method as claimed in claim 40 comprising measuring
15 said pressure values for said predetermined workload situation of the subject when said subject is not suffering from DHF and determining said reference value therefrom, and measuring said pressure values for said rest situation when said patient is not suffering from DHF and determining said reference value therefrom.